



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/498,254	02/03/2000	Mark S. Zediker	D9353-RE	8549

7590 04/05/2002

Westerlund & Powell PC
122 n Alfred Street
Alexandria, VA 22314

EXAMINER

LEUNG, QUYEN PHAN

ART UNIT	PAPER NUMBER
----------	--------------

2828

DATE MAILED: 04/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/498,254

Applicant(s)

ZEDIKER ET AL.

Examiner

Quyen P. Leung

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2001 and 04 January 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-24 is/are allowed.
- 6) ☒ Claim(s) 25-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the amendment filed 9/21/2001, claims 25, 26, 31, 32, 33, 36, 40, 41 have been amended. Claims 1-41 are pending. Applicant's arguments have been carefully considered, but not found entirely persuasive.

2. The amendment filed 9/21/2001 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "unconstrained" wavelength, "bandedge" filters. In particular,

- a. Claim 25 recites the limitation "unconstrained wavelength" in line 4.
- b. Claim 26 recites the limitation "bandedge filters" twice in lines 4-5.
- c. Claim 31 recites the limitation "bandedge filters" twice in line 5.
- d. Claim 33 recites the limitation "unconstrained wavelength" in line 3.
- e. Claim 36 recites the limitation "bandedge filters" twice in lines 5-6.
- f. Claim 41 recites the limitation "unconstrained wavelength" in line 3.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

3. Applicant's arguments with respect to claims 25-41 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 25, 26, 31, 33, 36, 40, 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 25 recites the limitation “unconstrained wavelength” in line 4. It is not clear what is meant by “unconstrained”, because a laser is a coherent light generator and therefore inherently constrained in wavelength to a degree.

7. Claim 26 recites the limitation “bandedge filters” twice in lines 4-5. It is not clear what is meant by “bandedge”.

8. Claim 31 recites the limitation “bandedge filters” twice in line 5. It is not clear what is meant by “bandedge”.

9. Claim 33 recites the limitation “an unconstrained wavelength within an Mth wavelength band” in lines 2-3. It is not clear what is meant by “unconstrained”, because the limitation appears to be contradicting itself. It appears that the wavelength should be unconstrained, or kept unconfined within close bounds, yet applicant has recited bounds, albeit close bounds, to which the wavelength should be confined.

10. Claim 36 recites the limitation “bandedge filters” twice in lines 5-6. It is not clear what is meant by “bandedge”.

11. Claim 40 recites the limitation “second optical oath” in line 16. It is unclear what “oath” has to do in the context of this claim. It appears that since it was not underlined

or bracketed to indicate that it was being amended, that applicant meant for it to be unchanged and to read --second optical path--.

12. Claim 40 recites the limitation "an cutout laser beam" in line 17. It is unclear what "cutout" has to do in the context of this claim. It appears that since it was not underlined or bracketed to indicate that it was being amended, that applicant meant for it to be unchanged and to read --an output laser beam--.

13. Claim 41 recites the limitation "unconstrained wavelength" in line 3. It is not clear what is meant by "unconstrained" for the same reason given above.

Claim Rejections - 35 USC § 102

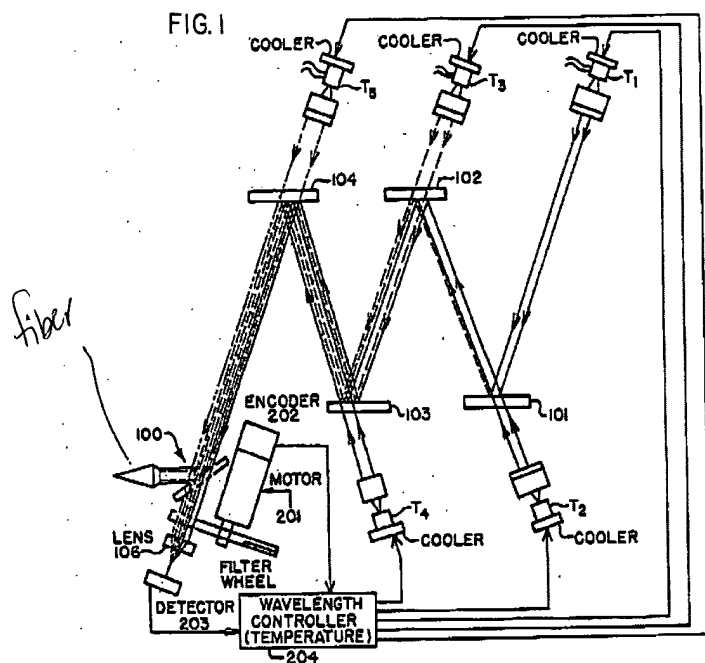
14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 25-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Casey (4,823,357). Casey discloses the claimed invention.

Regarding claim 25, Figure 1 illustrates a laser head assembly generating an output beam, the laser head assembly including M modules (**T1, T2, T3, T4, T5**) which generate M laser beams, wherein each of the M laser beams has a different "unconstrained" wavelength (see col. 4 lines 3-9); and M-2 dichroic filters (**101, 102, 103**), wherein each of the M-2 dichroic filters transmits a corresponding one of the M



laser beams and reflects all other of the M laser beams into a predetermined optical path to produce the output beam, where M is an integer ≥ 2 .

Further, since applicant used the open-ended claim language "comprising" and did not use claim language such as "only M-2 dichroic filters", the claimed invention does not preclude additional filters.

"Unconstrained" is a relative term and is subject to broad interpretation. As such, Casey inherently meets it.

Regarding claim 26, Figure 1 illustrates a laser head assembly generating an output beam, the laser head assembly including M modules (T1, T2, T3, T4, T5) which generate M laser beams, wherein each of the M laser beams occupies a different wavelength band(see col. 4 lines 3-9); and M-R dichroic "bandedge" filters (101, 102, 103), wherein each of the M-R dichroic "bandedge" filters transmits at least one of the M laser beams occupying a given wavelength band and reflects all other of the M laser

Art Unit: 2828

beams not occupying the given wavelength band; and an optical device (**104**, see col. 4 lines 35-41) which combines the M laser beams to thereby produce the output beam, where M and R are positive integers; and M is an integer ≥ 2 .

It is inherent that Casey meets the claimed language of “bandedge” filters, because (1) in the remarks section of the 9/21/2001 amendment, on page 5 in the last three lines of the first full paragraph, applicant pointed to the definition applicant’s col. 8 lines 2-3 for support of the bandedge filters, (2) in col. 8 lines 2-3, applicant teaches that the filters can be lowpass, highpass or bandpass and (3) Casey’s filter definitely falls in one of these three categories.

Regarding claim 27, see col. 4 lines 32-41 for the teaching about that the optical device comprises means **104** for collecting the M laser beams.

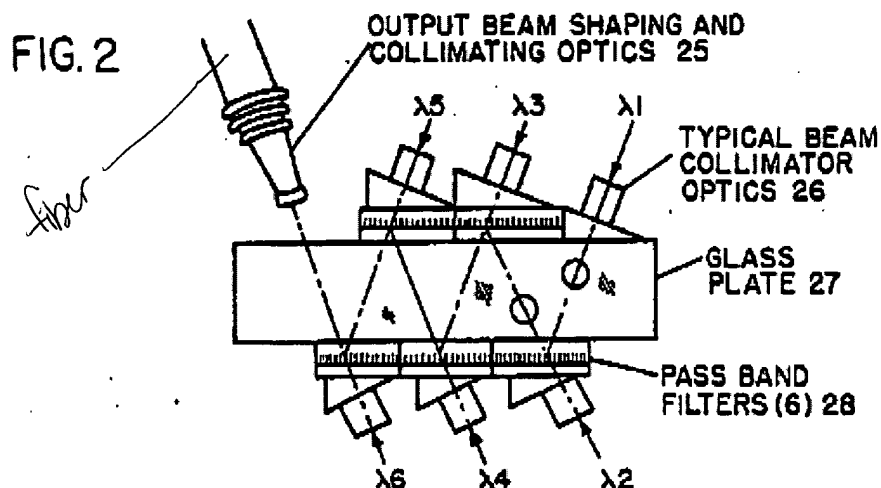
Regarding claim 29-30 and 35, see col. 7 lines 64-68 about the polarization beam combiner for doubling the laser output by combining two combined laser beams.

Regarding claim 31, Figure 1 illustrates a laser head assembly generating an output beam including M laser beams, comprising M modules (**T1, T2, T3, T4, T5**) which generate M laser beams, wherein each of the M laser beams has a different single wavelength (see col. 4 lines 3-9); and M-2 dichroic “bandedge” filters (**101, 102, 103**), wherein each of the M-2 dichroic “bandedge” filters transmits a corresponding one of the M laser beams and reflects all other of the M laser beams; where M is an integer ≥ 2 .

Regarding claim 33, note Figures 1 and 2 which illustrate a method for generating a high energy laser beam comprising (a) generating P collimated laser

Art Unit: 2828

beams (see col. 4 lines 3-9 for the teaching of diode laser arrays, i.e. P laser beams,

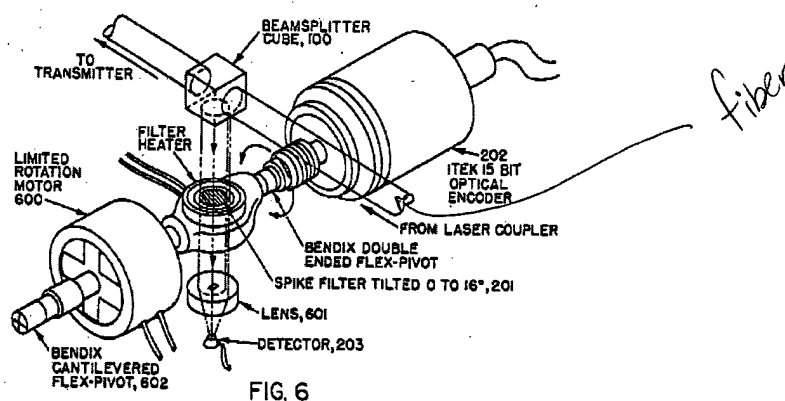


and see col. 4 lines 16-17 and col. 5 lines 34-64 for the teaching of collimated laser beams via diffraction limited lenses), each of the P collimated laser beams having an “unconstrained” wavelength within an Mth wavelength band; (b) repeating step (a) M times so as to produce MxP collimated laser beams grouped into M different wavelength bands (λ_1 - λ_5 – see col. 4 lines 3-9); and (c) coupling the MxP collimated laser beams into an optical path (via elements **101**, **102**, **103**, **104**) to produce a high energy laser beam (see col. 4 lines 24-41), wherein M and P are integers ≥ 2 .

Regarding claim 34, note step (c.) comprises dichroically coupling the MxP collimated laser beams into the optical path is taught by Casey because elements **101...104** are dichroic filters.

Regarding claims 28, 32, and 36-40, Casey has been discussed above and note also for a fiber coupling device (25 in figure 2).

Regarding claim 41, Casey's Figure 2, as discussed above, illustrates a method for generating a high energy laser beam comprising (a) generating P collimated laser beams (see col. 4 lines 3-9 for the teaching of diode laser arrays, i.e. P laser beams, and see element **26** for collimating the laser beams (λ_1 - λ_6); (b) repeating step (a) M times so as to produce MxP collimated laser beams having M different wavelength bands (λ_1 - λ_6); and (c) coupling the MxP collimated laser beams into an optical path (via elements **28**); wherein M and P are positive integers and both M and P ≥ 2 . Note further figures 1, 2, and 6 illustrating the coupling (via 100 or 25) the MxP collimated laser beams into an ith optical fiber (see figures 1, 2, 6 and col. 2 lines 11-21), where $i=1$ to N and N can be 1.



Allowable Subject Matter

16. Claims 1-24 are allowed.
17. The following is an examiner's statement of reasons for allowance:

The prior art cited on the form PTO-1449 represent the most relevant prior art known. However, Applicant's claimed invention distinguishes over the prior art for the following reasons.

The claims are allowable over the prior art of record because none of the references either alone or in combination, discloses or renders obvious, the following:

a. As per claims 1-8, a diode laser system comprising M modules generating M laser beams, wherein each laser beam has a different single wavelength, M-2 dichroic filters, wherein each of the M-2 dichroic filters transmits a corresponding one of the M laser beams and reflects all other of the M laser beams, a fiber coupling device for collecting the M laser beams for generating one of N output beams, N optical fibers for receiving respective ones of N output beams and generating N received output beams, and an optical assembly for focusing the N received output beams on a single spot, where N and M are both ≥ 2 .

b. As per claims 9-13 a diode laser system comprising M first modules generating M first laser beams, wherein each first laser beam has a different single wavelength, M-1 first dichroic filters defining a first optical waveguide for directing all of the M first laser beams into a first optical path, wherein each of the M-1 first dichroic filters transmits a corresponding one of the M first laser beams and reflects all other of the M first laser beams, a fiber coupling device disposed adjacent the first optical path collecting the M first laser beams to produce one of N output beams, N optical fibers for receiving respective ones of N output beams and generating N received output beams, and an optical assembly for recollimating and focusing the N received output beams on a single spot, where N and M are both ≥ 2 .

c. As per claims 14-20, a diode laser system comprising means for generating N laser beams, wherein each of the N laser beams includes multiple

Art Unit: 2828

wavelengths of light and the generating means comprises M first means for generating M first laser beams, wherein each first laser beam has a different single wavelength, M-1 first filter means defining a first optical waveguide for directing all of the M first laser beams into a first optical path, wherein each of the M-1 first filter means transmits a corresponding one of the M first laser beams and reflects all other of the M first laser beams, a fiber coupling device disposed adjacent the first optical path collecting the M first laser beams to produce one of N output beams, N optical fibers for receiving respective ones of N output beams and generating N received output beams, and an optical assembly for recollimating and focusing the N received output beams on a single spot, where N and M are both ≥ 2 .

As per claims 21-24, a method for generating a high energy laser beam comprising:

- (a) generating P collimated laser beams having an Mth wavelength
- (b) repeating step (a) M times to produce MxP collimated laser beams having M different wavelengths,
- (c) coupling said MxP collimated laser beams into an optical path,
- (d) coupling the MxP collimated laser beams into an i th optical fiber, where $i=1$ to N,
- (e) repeating steps (a) through (d) N times to generate N output laser beams,
- (f) recollimating the N output laser beams to produce N recollimated laser beams and

Art Unit: 2828

(g) focusing the N recollimated laser beams onto a single spot where M, N, P are integers ≥ 2 .

Applicant provides the advantageous benefits of the claimed invention in col. 4, a benefit of which includes attaining a diode laser system which would not require both a large amount of real estate and complex optical assemblies to couple the outputs of a plurality of output modules to a single spot.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quyen P. Leung whose telephone number is (703) 308-0545. The examiner can normally be reached on 8:30-5:00, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Quyen P. Leung
Primary Examiner
Art Unit 2828

QPL
April 3, 2002